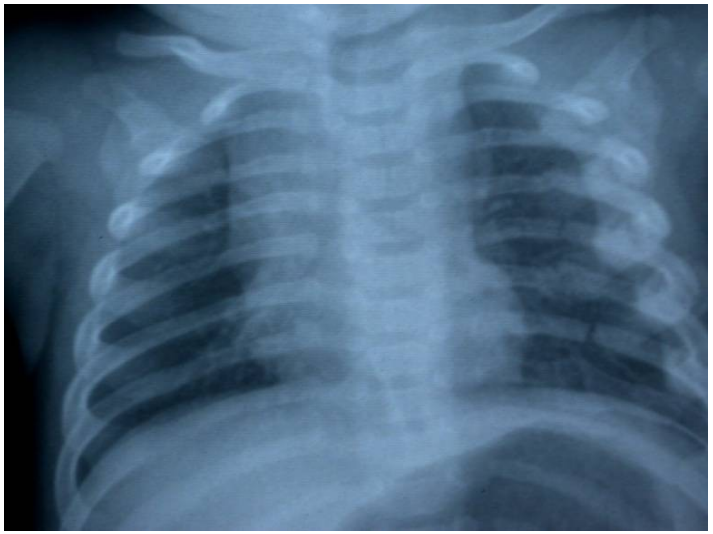


Child Protection Foundation Training

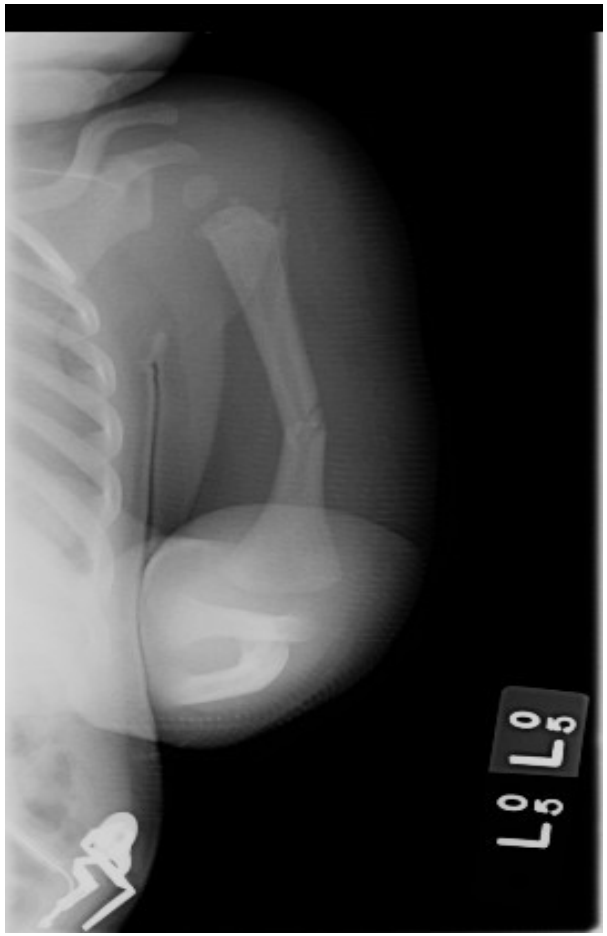
Indicators of Physical Abuse
Fractures

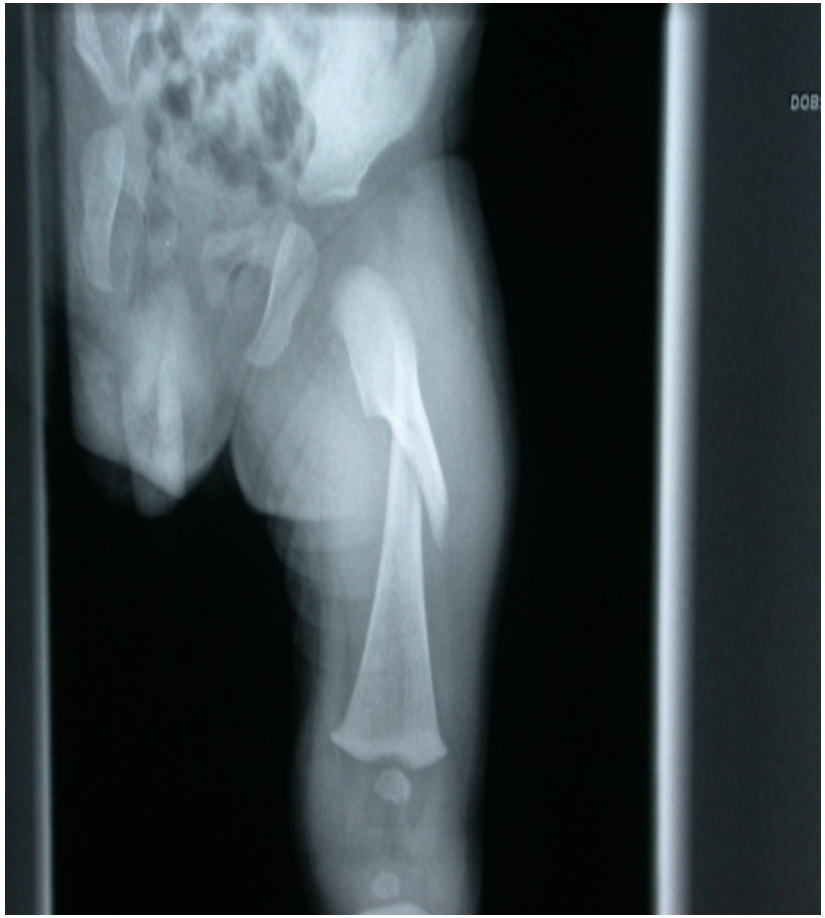
Illinois Department of DCFS Children & Family Services

Core Competencies

- Identify and document physical and medical evidence as required by the allegation.
- Accurately assess safety:
  - Identify the injury
  - Identify specific threat to safety
  - Identify evidence of the threat to safety

Fractures



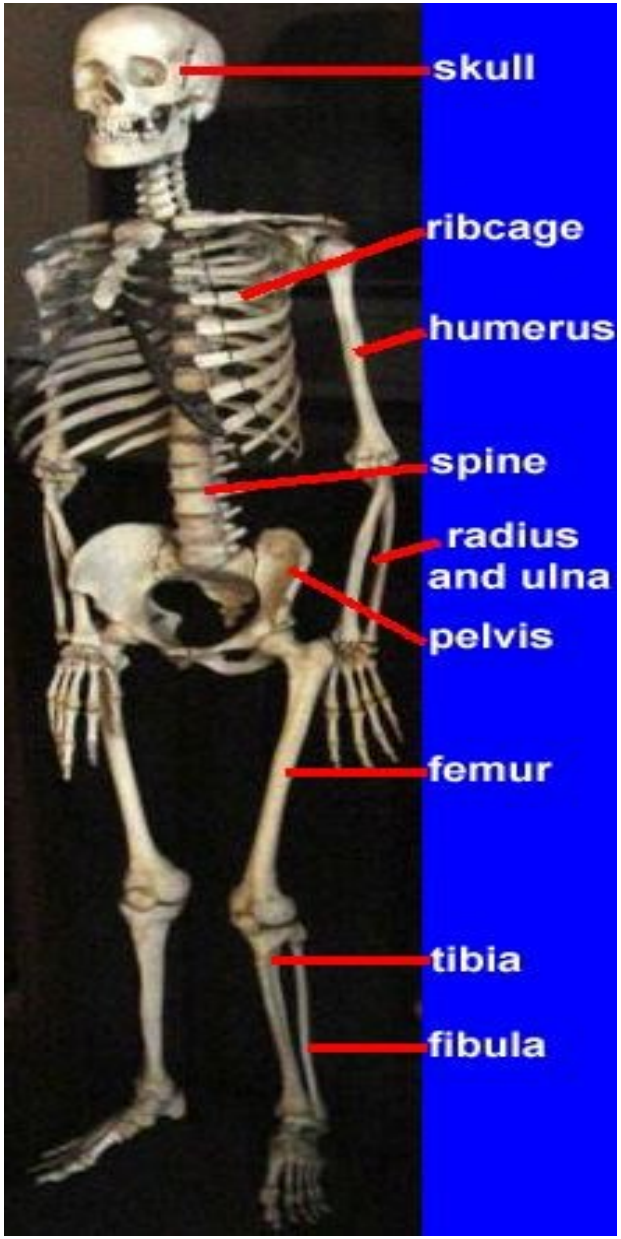


Fractures - Background

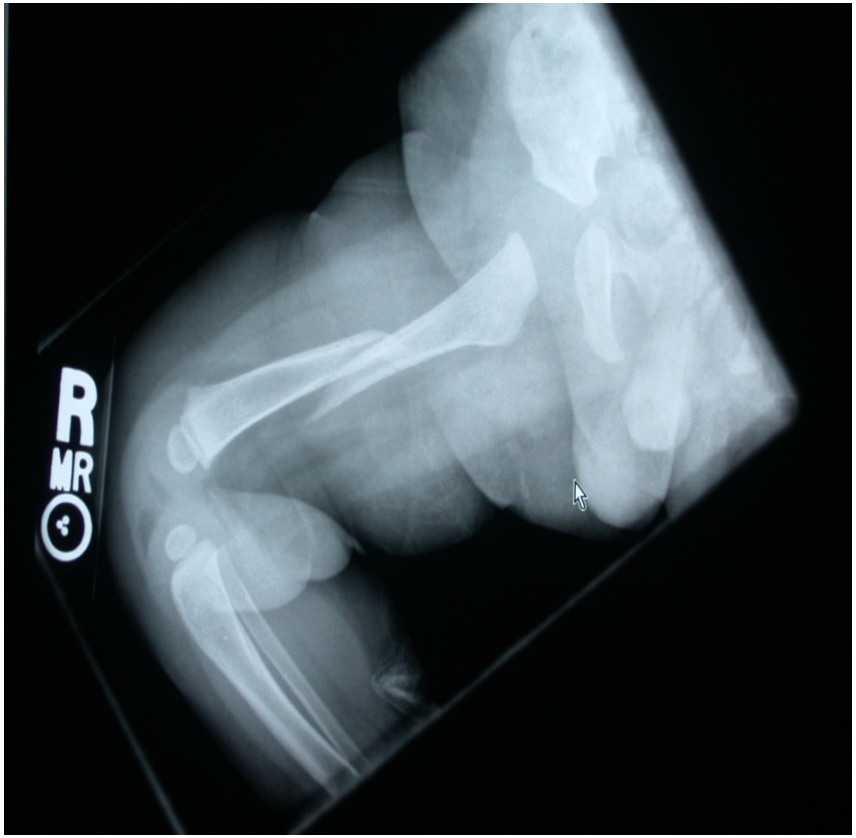
- Common in ambulatory children
- Not common in non-ambulatory children
- Frequency of fractures associated with child abuse varies from 11%–55%**
- Age is the most important risk factor**
  - 80% of abusive fractures are in children <18 mo

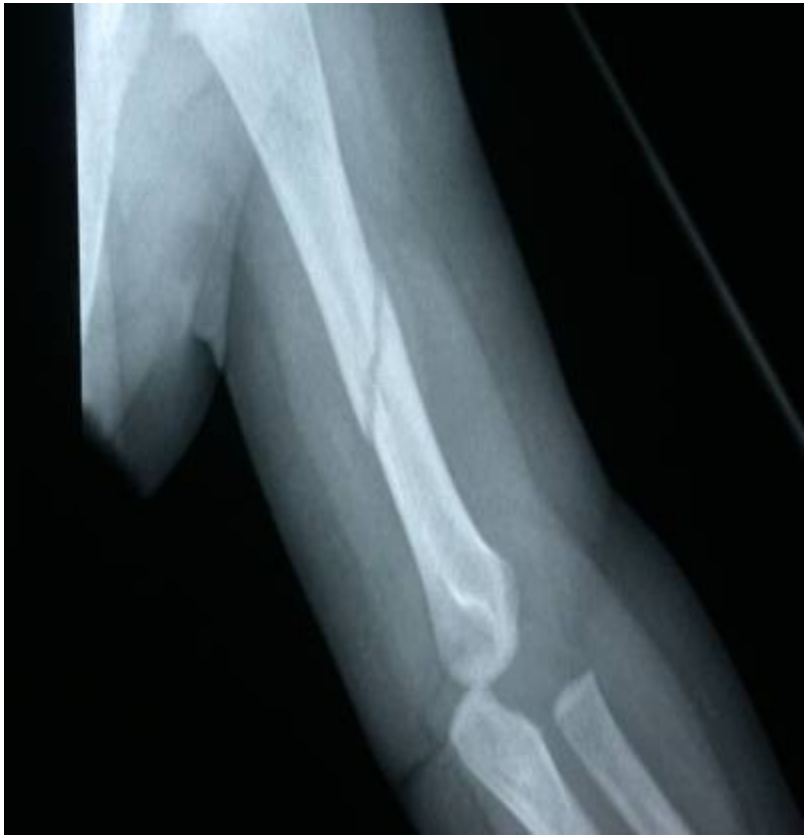
**Reece RM & Ludwig S. Child Abuse: Medical Diagnosis and Management – 2nd Edition; 2001: 123-124.

Review of bones in the body…



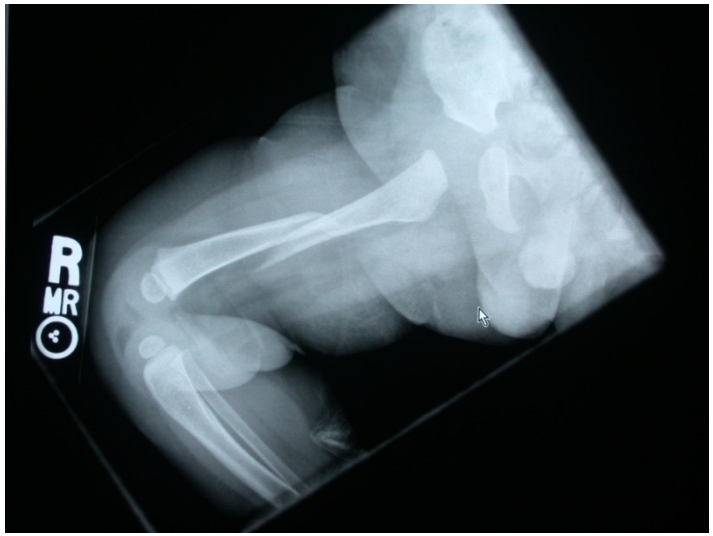
Does Mechanism Fit Injury?

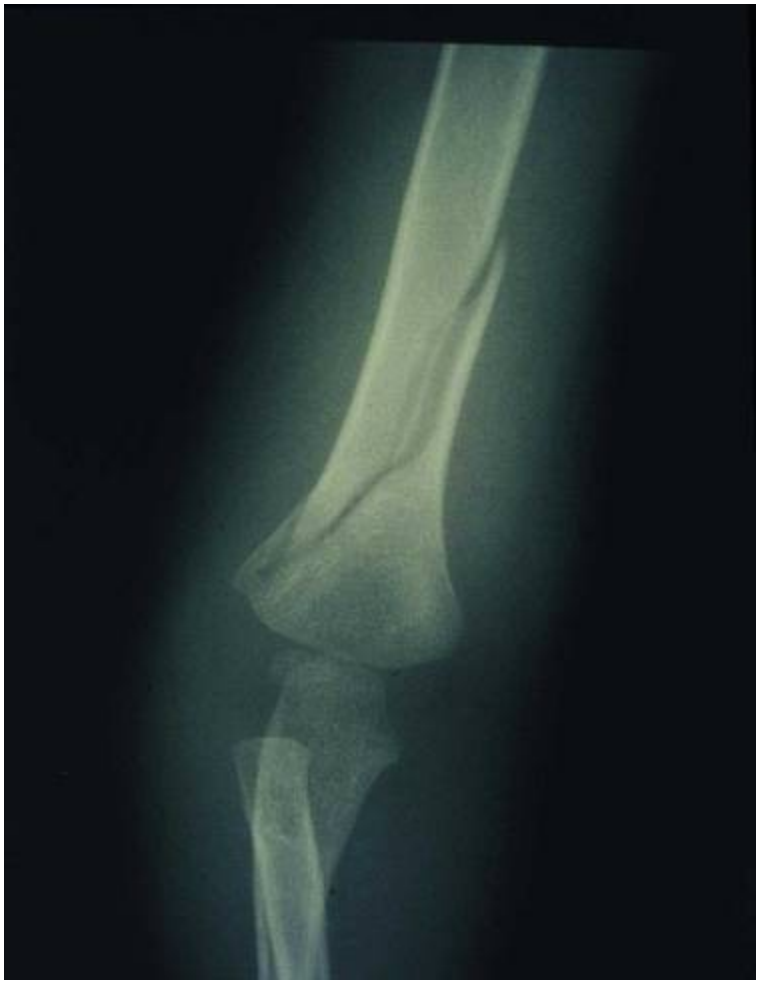




Fractures - Presentation

- Swelling to extremity
- Pain to extremity
- Decreased or no movement
- No symptoms





Fracture - Diagnosis

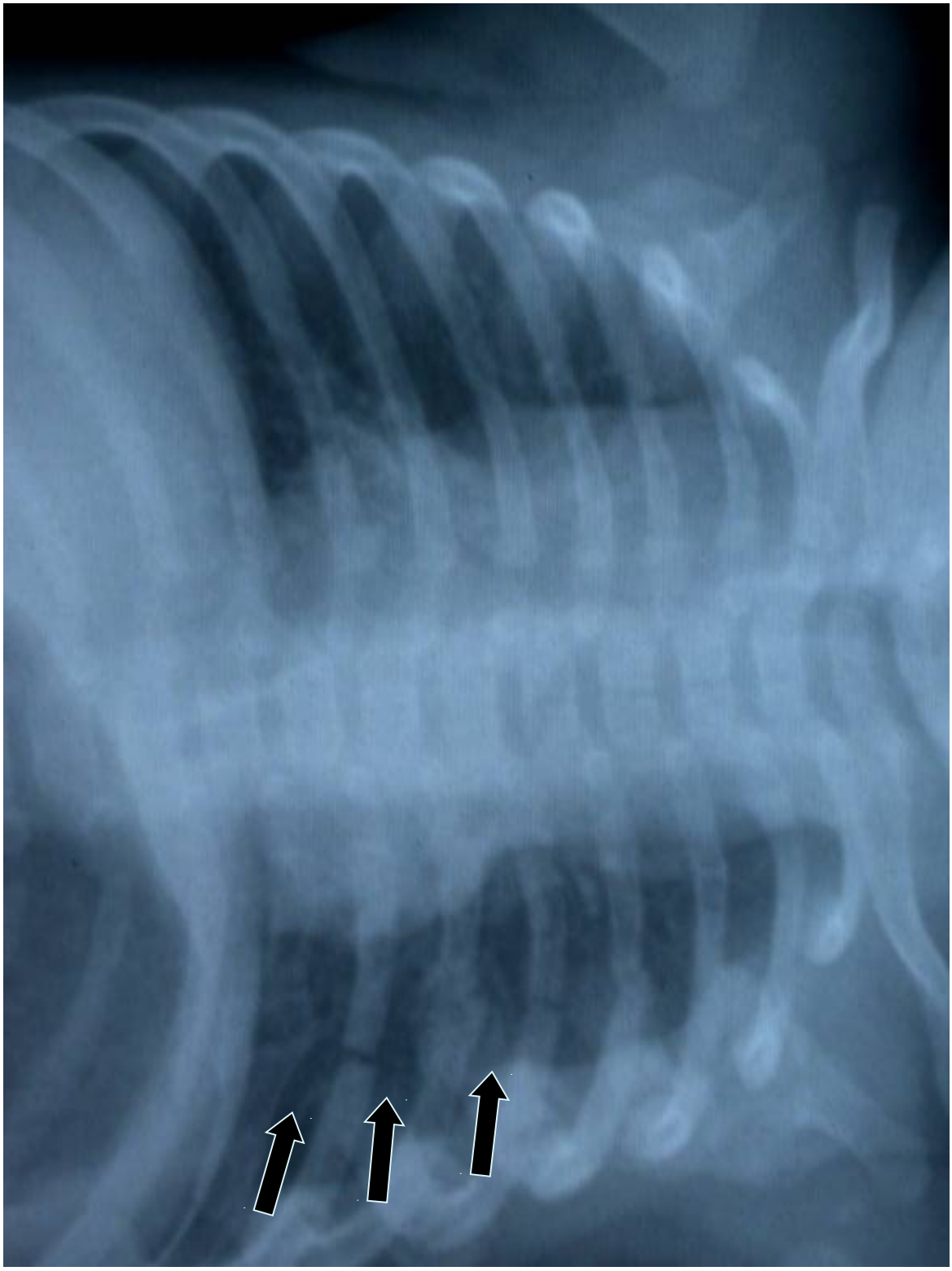
- X-ray, skeletal survey, bone scan, CT scan
- Initial x-ray may miss fractures before healing
- Repeat skeletal survey in two weeks

Fracture - Diagnosis

- **Skeletal survey vs. Bone Scan**
  - Bone scan involves IV injection and sedation
  - Bone scan shows fractures in earlier stage of healing
  - Bone scan not reliable for skull or corner fractures
  - Bone scan as adjunct, not replacement, for survey
  - Valuable if cannot wait for repeat skeletal survey

Dating Fractures

- Induction – acute fracture
  - 3-7 days; pain, swelling, inflammation
- Soft Callus – early healing
  - Infants 7-10 days; children 10-14 days
  - Periosteal new bone formation
- Hard Callus – late healing
  - 14-21 days; union at fracture site
- Remodeling
  - 3 months-1 year; woven to lamellar bone



Fractures and Bone Disease

- Bone disease can predispose to fracture**
  - Rickets
  - Osteogenesis Imperfecta (OI)
  - Kidney Disease
  - Cerebral Palsy (Immobile children)
  - Osteopenia of prematurity

**These medical conditions are very rare and can be ruled out by medical evaluation

Osteogenesis Imperfecta (OI)

- Genetic disorder of connective tissue
  - Abnormal quality or quantity of Type I collagen
- Four types of OI – Type I most common
- Excessive bone fragility and osteopenia
- Major features:
  - Scleral hue, defective dentition, hearing impairment (older children/adults), ligamentous laxity
- Other:
  - Short stature, easy bruising, constipation, valve disease

Diagnosis of OI

- History and physical exam
  - Family history of OI, fractures, hearing problems
- X-rays – osteopenic bones +/- fractures
- Skin Biopsy
- Blood tests
- Genetics consult
  - Helpful in guiding work-up and formalizing diagnosis

Fracture – Vital Information

- Is there any history of injury?
- Who was the caretaker at the time?
- What was the position of the child before, during, and after the injury?
- What are the child's developmental abilities?
- Symptoms - onset and description
  - When was the child last well?
  - When was the child last moving extremities? Weight bearing? Walking? Feeding? Etc.
  - When did symptoms (pain, swelling, decreased movement) begin and who noticed them?
- Who witnessed the injury?

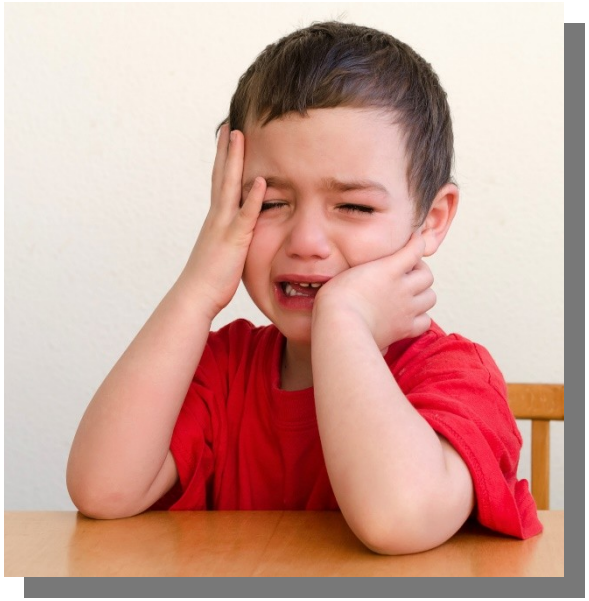
Fractures – Vital Information

- If there is no history of injury given:
  - What is the timeline of activity in the prior 72 hours?
    - Focus questions according to developmental abilities: diaper changes, dressing of child, bearing weight, walking, crawling, moving extremities, feeding
  - Who were all the caretakers in the prior 72 hours?

Fractures – Vital Information

If there is no history of injury given:

- Was there a delay in seeking care?
- Were there any possible precipitating events?
  - Diaper changes
  - Bathing /dressing
  - Tantrums / discipline



Investigate…don't postulate

- **Background information:**
  - 14 month old with spiral tibial fracture
  - Child at grandmother's house, grandmother placed child on couch, went to change laundry. Heard crying and came back to find patient on floor at foot of couch.
  - Pt cried immediately then consoled.
  - Pt brought in the next day for favoring left leg

Excerpts from worker's notes

- "The minor could not in CPS opinion suffer from a spiral fracture if she fell off of the couch."

- "CPS believes that the minor was about to fall and someone was on the couch and grabbed her leg to prevent her from falling and she twisted around in the process."

Excerpts from Worker's notes…

- "CPS brought that scenario to the mother but the mother denied that happened."
- "CSI explained to the mother how a child could receive a spiral fracture."
- "Mother denied any grabbing of the minors leg causing her to twist and break the leg."

Red Flags

- Inconsistent history
  - Changing or no history
  - Incompatible with developmental level
- Non-ambulatory children
- Multiple fractures
- Fractures of different ages
- Rib or metaphyseal (corner) fractures
- Spine, scapula, sternum fractures (rare)
- Delay in seeking care
- Other signs of CA/N

Common Misconceptions

- Spiral or oblique fractures are indicative of abuse
  - Toddler fracture - spiral fracture of tibia
- All fractures should be clinically obvious
  - Rib and CML fractures usually occult
- Short falls are a common cause of fractures
  - Studies suggest differently

Common Misconceptions (Cont'd)

- Prematurity predisposes children for fractures
  - Yes, but only infants with osteopenia of prematurity

Examples

- 4 month old with spiral femur fracture
- 2 year old with spiral femur fracture
- 14 month old with clavicle fracture
- 2 month old with rib fractures
- 7 year old with cerebral palsy with humerus fracture

Bone Fractures - Summary

- What are your gut reactions to these graphic slides?
- Can you observe these injuries?
- Can you document these injuries?
- Can you work with these families…
  - Identify their strengths?
  - Help them protect their children?

Questions?